Drift and systematic bias in Tropical Atlantic using EC-Earth3 seasonal hindcasts

Eleftheria Exarchou, Chloé Prodhomme, Virginie Guemas, Francisco Doblas-Reyes

eleftheria.exarchou@ic3.cat
(in PREFACE since September 2014)

General goals

- Analyze the drift and systematic bias in SST, SSS, surface wind and surface fluxes in Tropical Atlantic.
  → EC-Earth3 seasonal hindcasts
  → HadISST, ERSST, ERAint, JRA-50, GPCP, TRMM, EN4, WOA, GLORYS2v1, ORA-S4, GloSEA5, ORA-P5.

- Analyze the heat budget of Tropical Atlantic mixed layer and its contributions to the drift/bias.

- Sensitivity of results to resolution
  → Seasonal hindcasts at both standard and high resolution.

- Sensitivity of results to initial conditions.
  → Initialized by GLORYS2v1, ORA-S4

Methods

- EC-Earth3.0.1 in T255L91-ORCA1L46 configuration

- Initialization on 1st May and 1st November every year from 1993 to 2009

- 4 month forecasts

- 10 ensemble members generated by using singular vectors for the atmospheric conditions

- Ocean and sea ice initialized from interpolated GLORYS2v1[*] restarts

- Atmosphere and land initialized from ERA-interim.

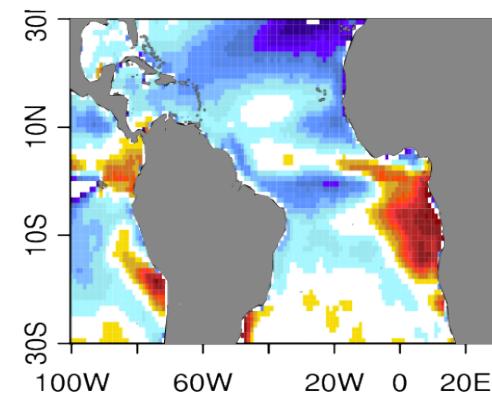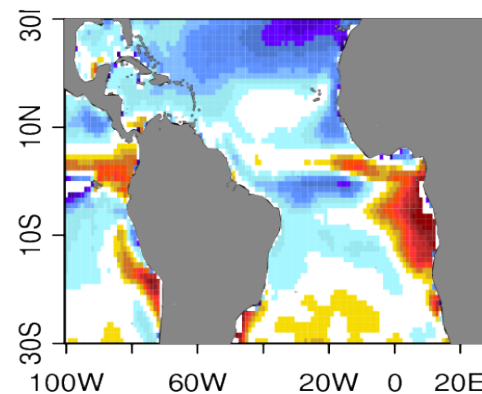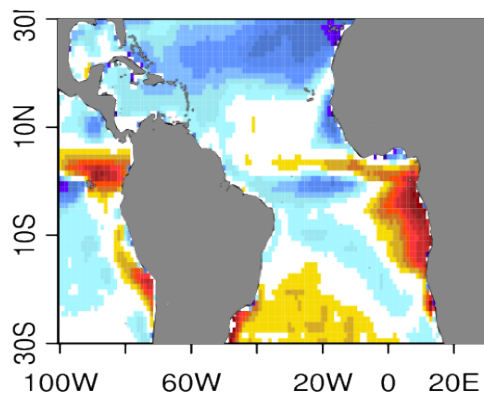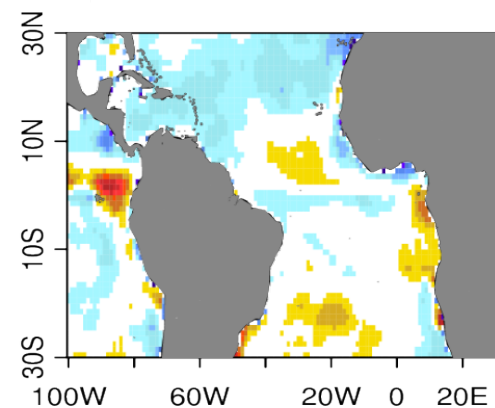[*] Red Flag: Years , 1997, 2001-2002 high subsurface equator biases, Yann Planton

SST biases, wrt HadISST
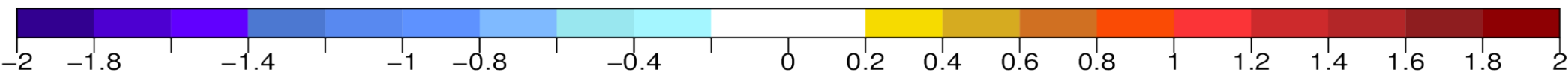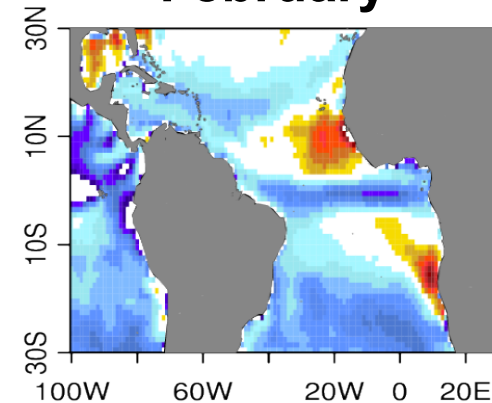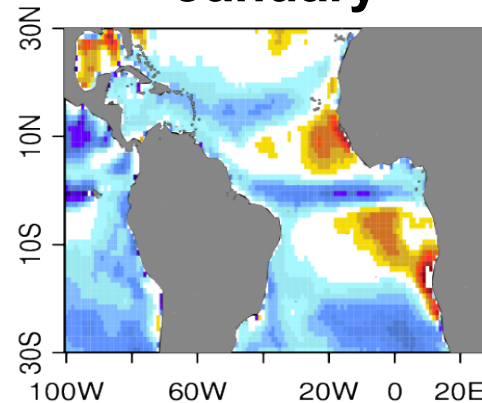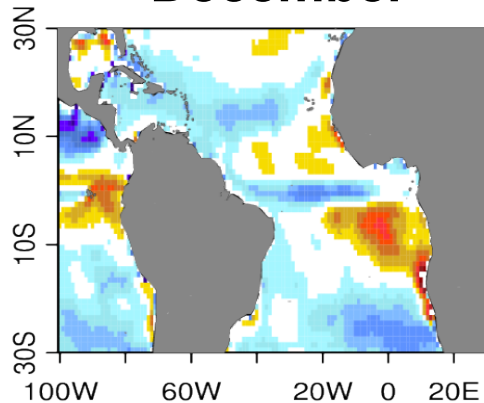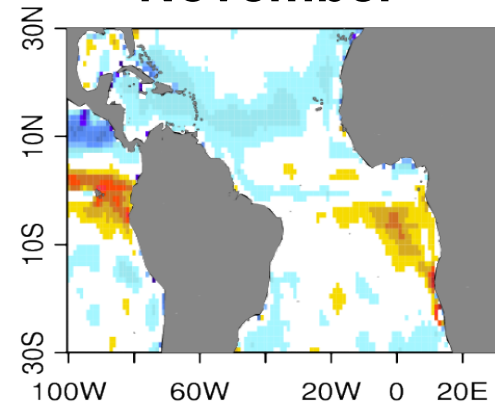
SST biases, wrt HadISST
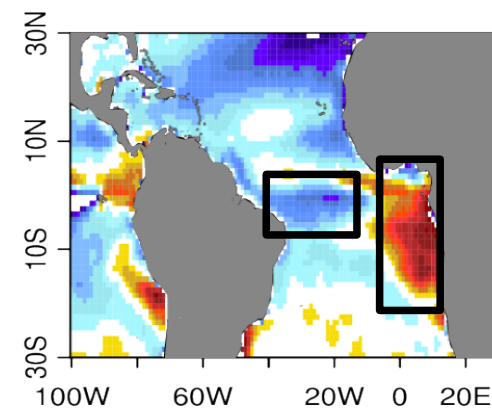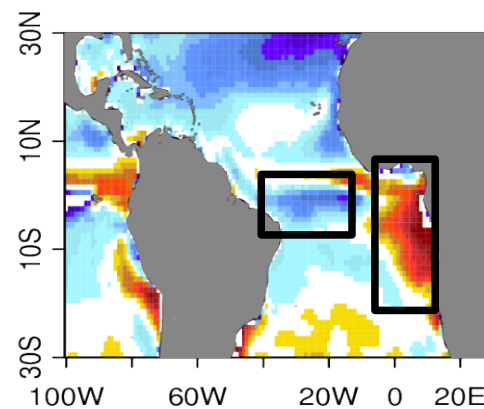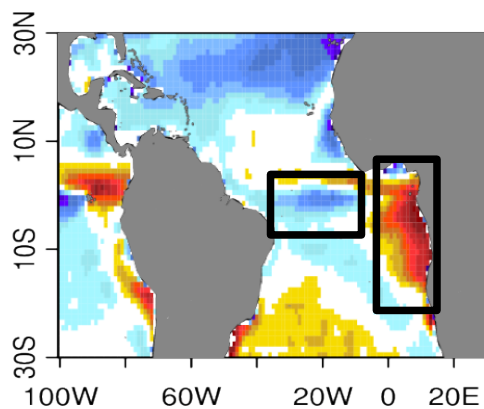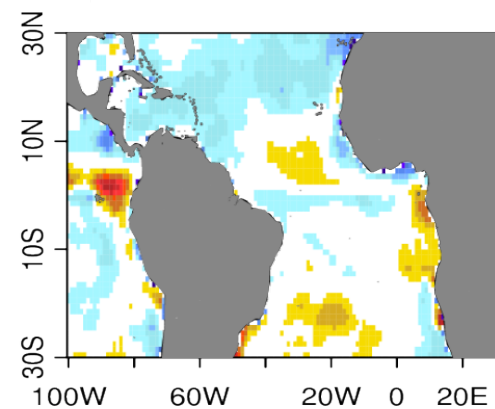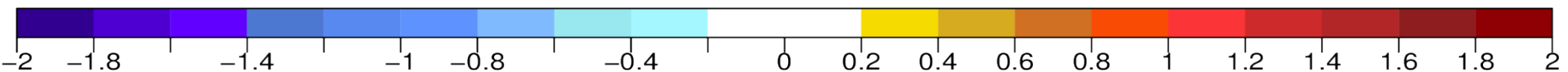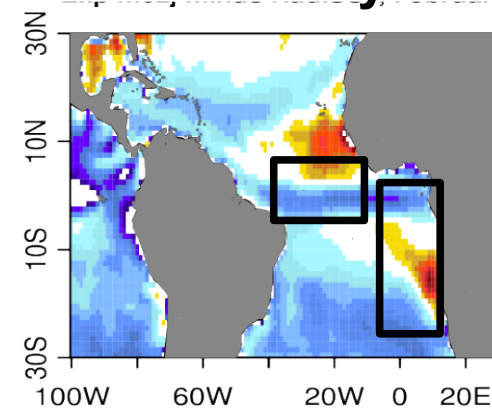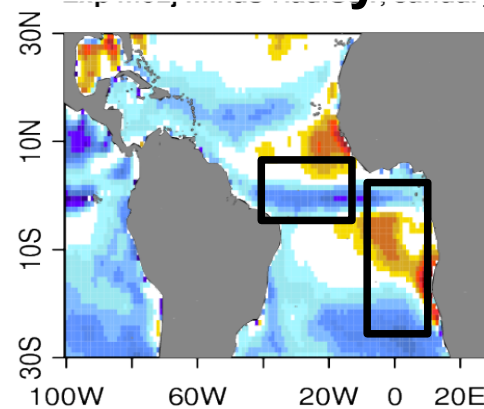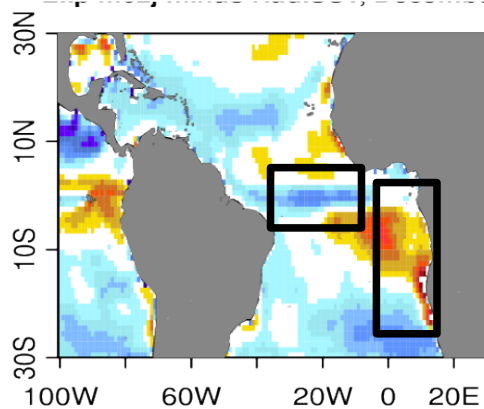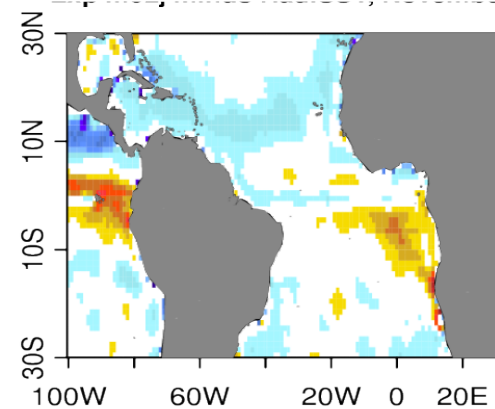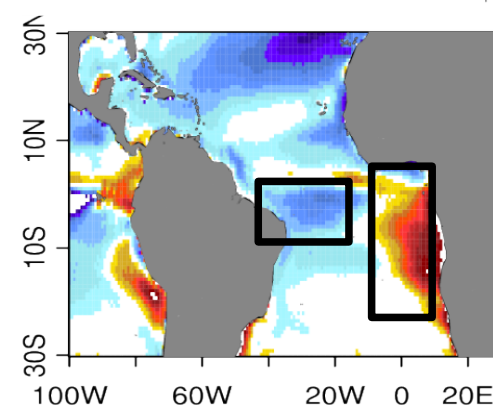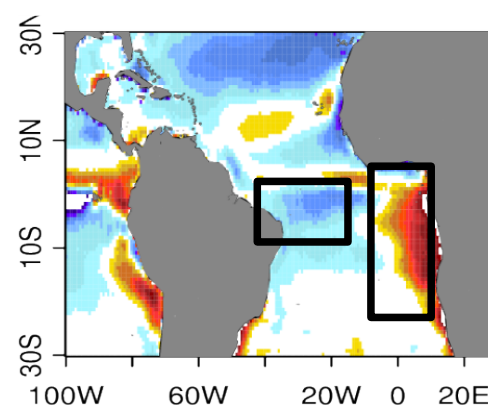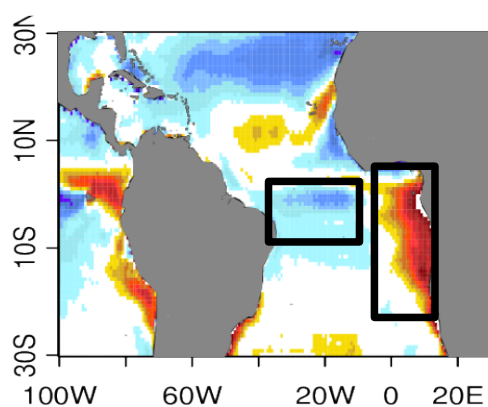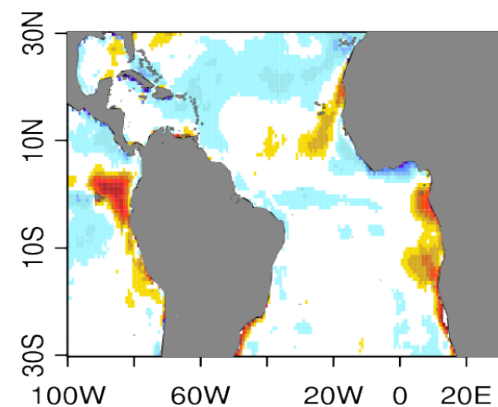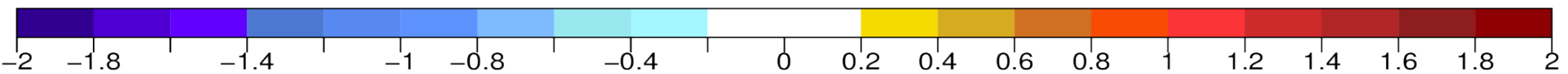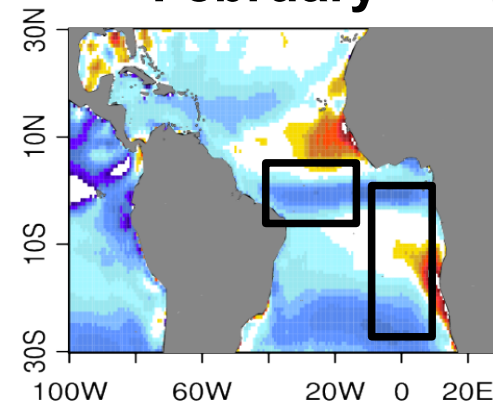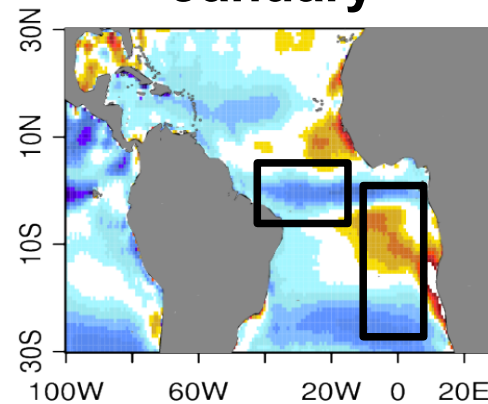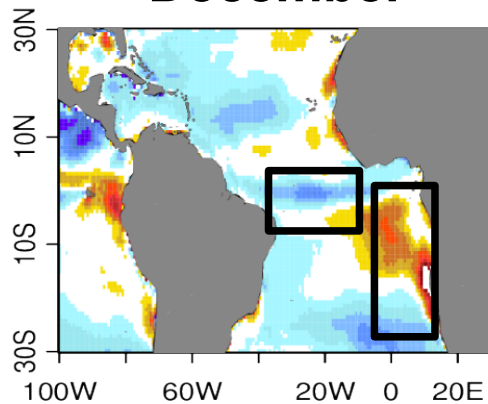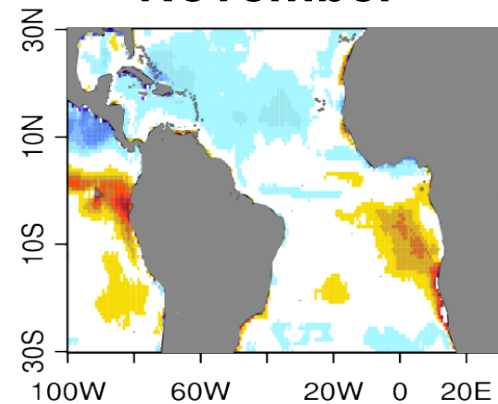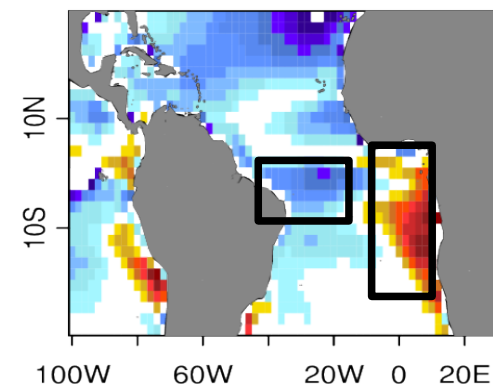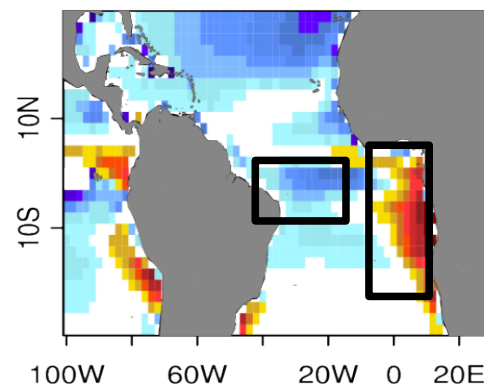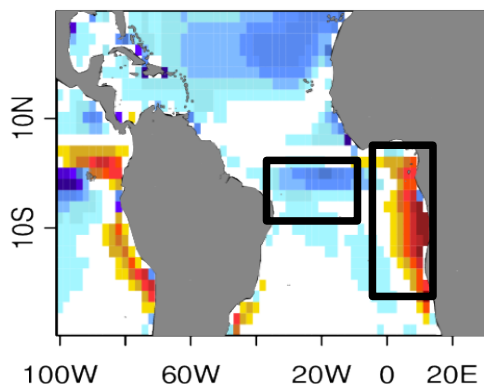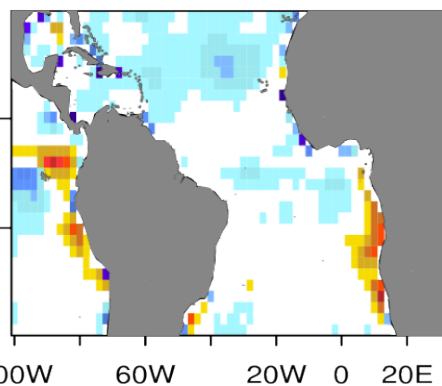
SST biases, wrt ERAint

SST biases, wrt ERSST
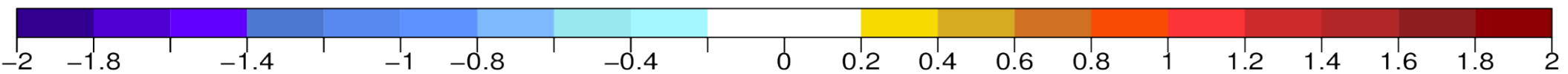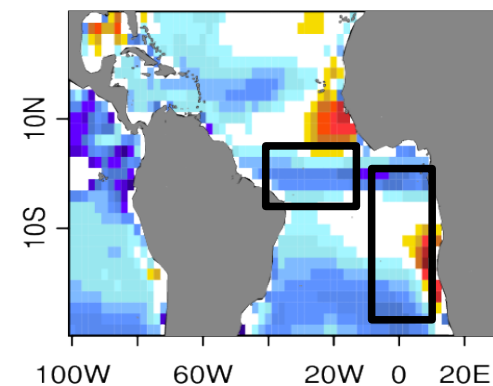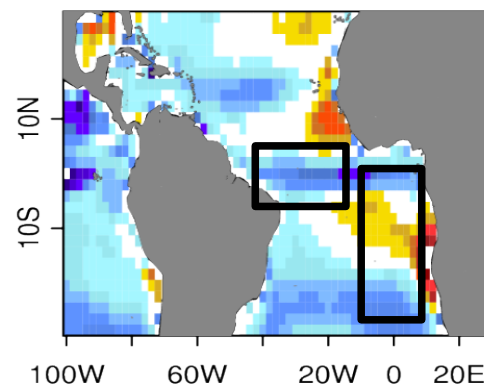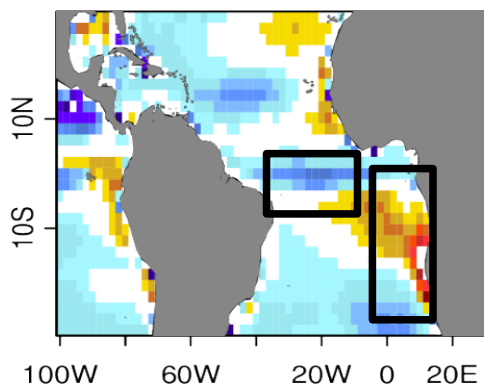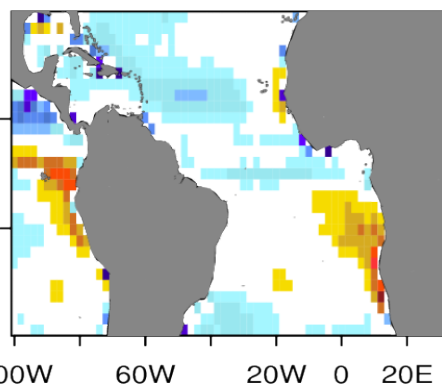
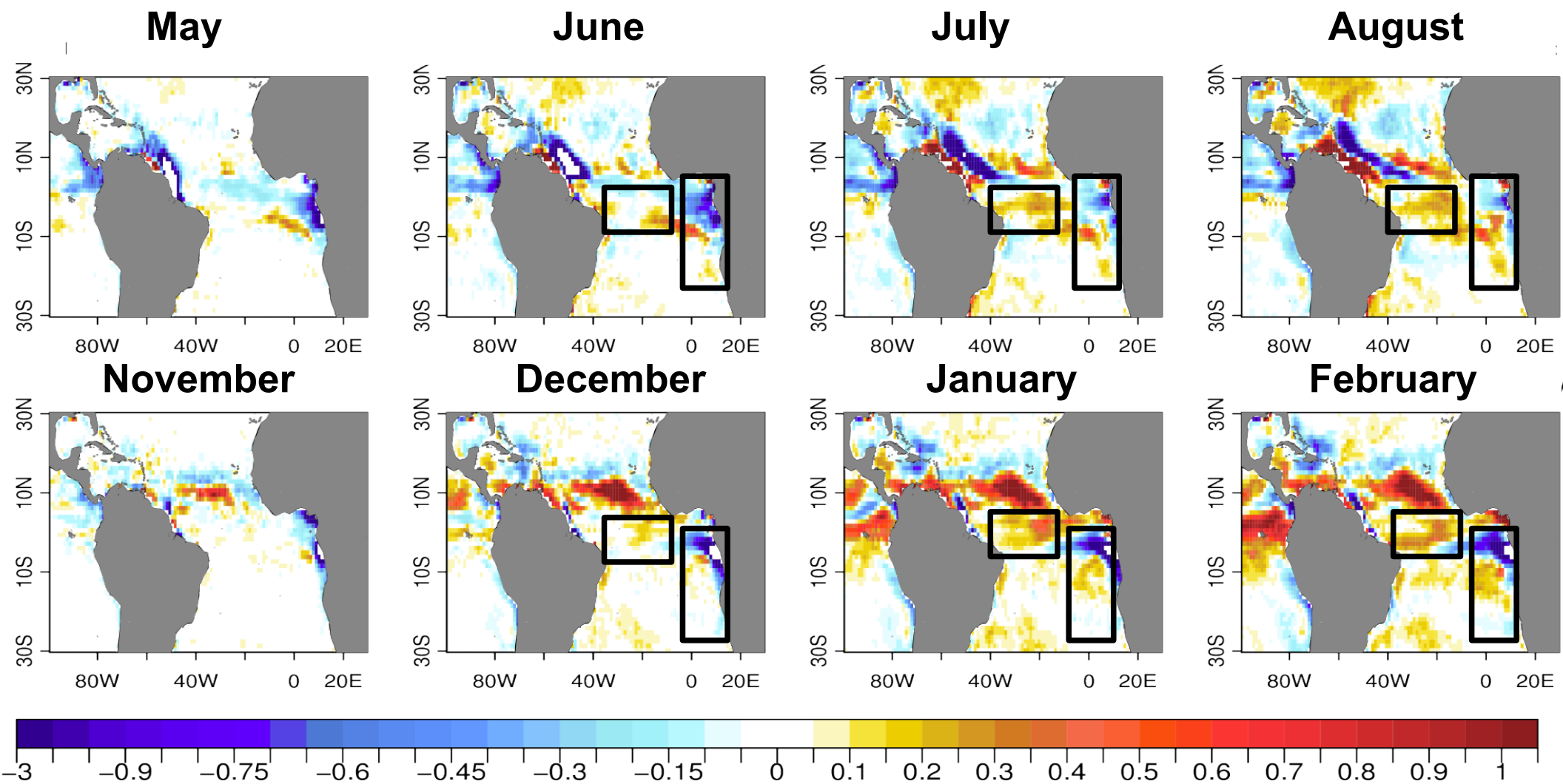# SST biases, wrt GLORYS2v1
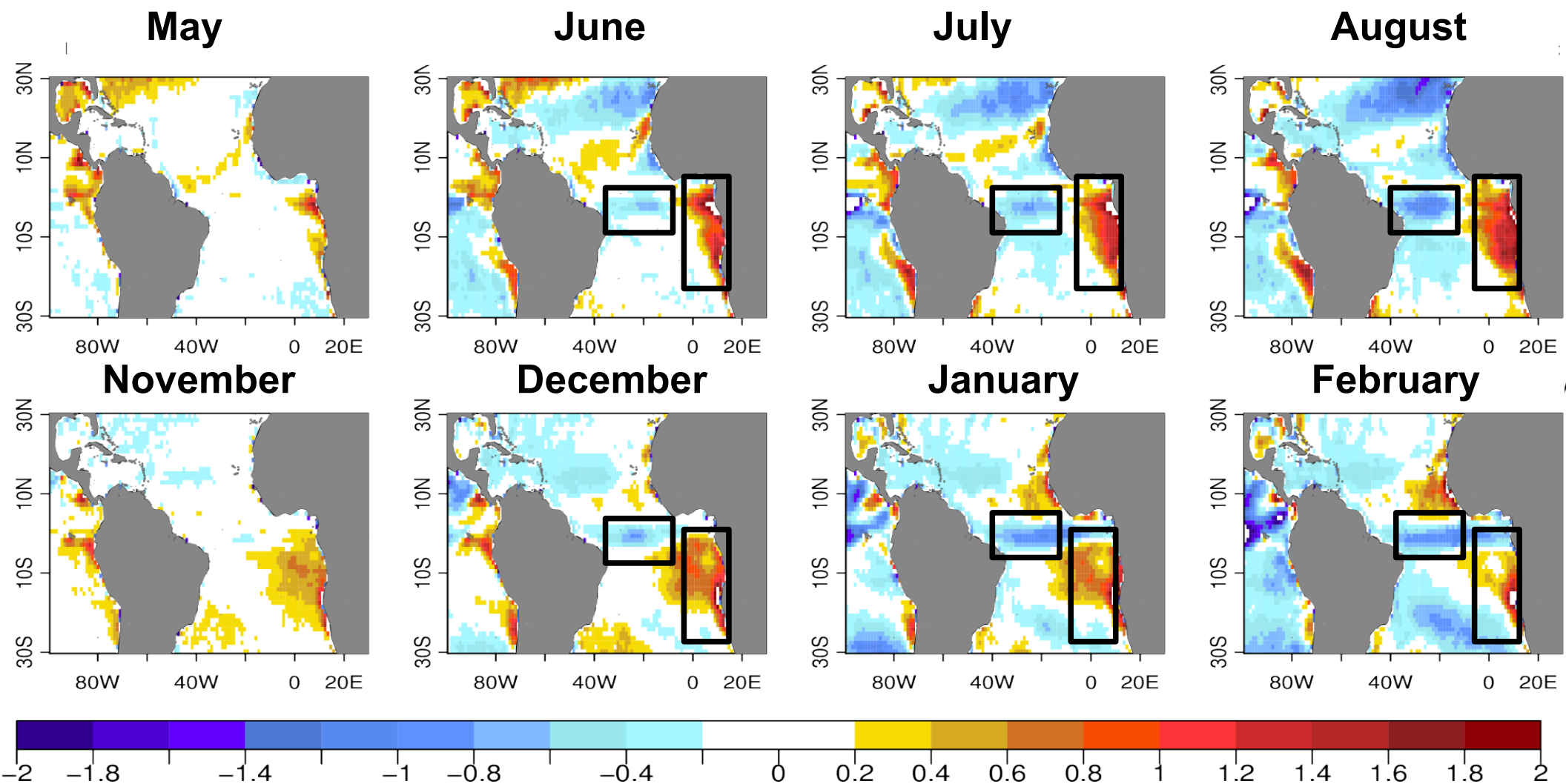
SSS biases, wrt GLORYS2v1

Precipitation biases, wrt GPCP
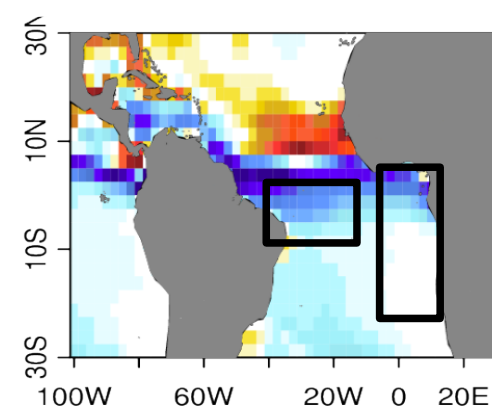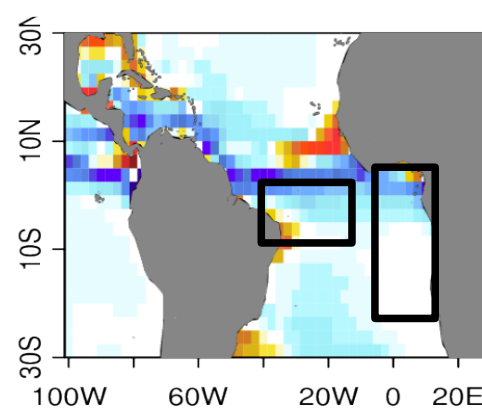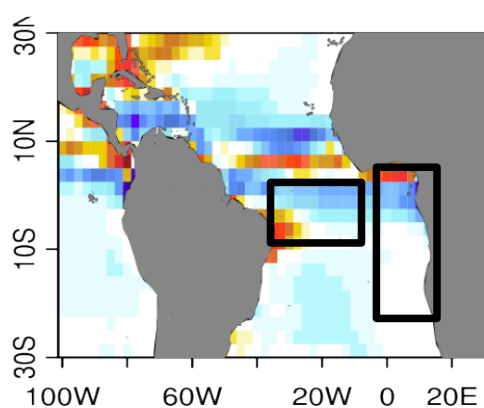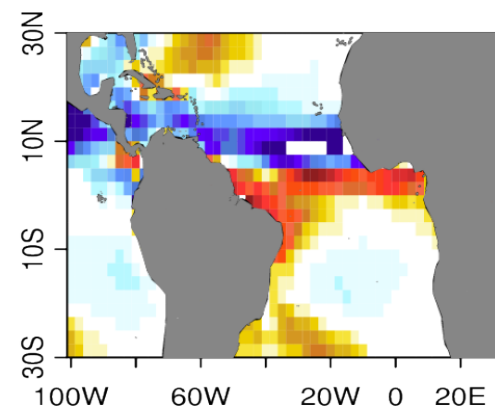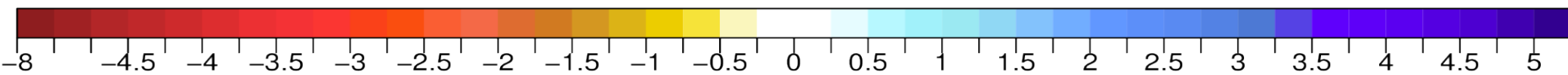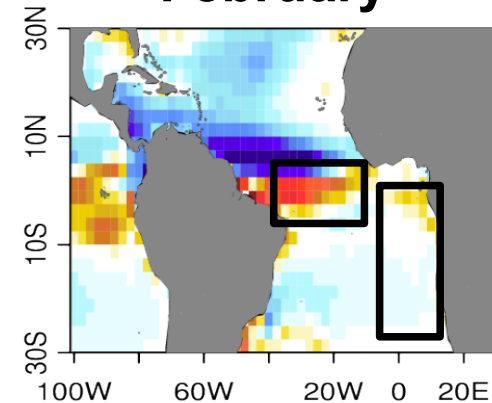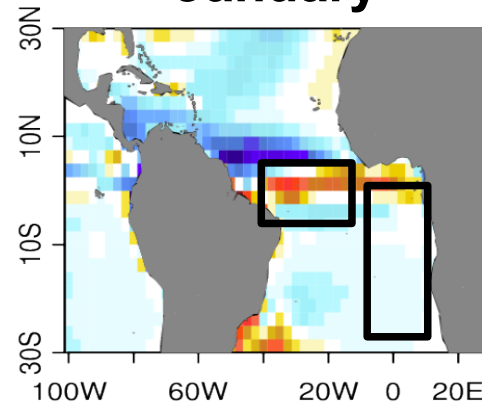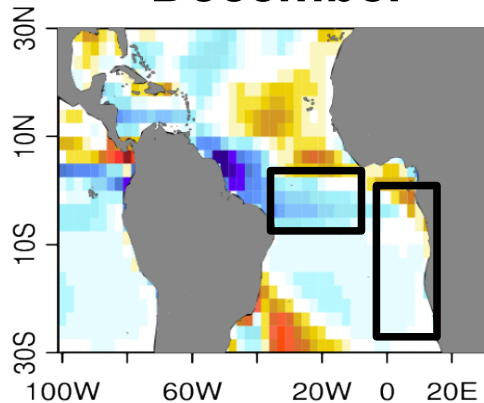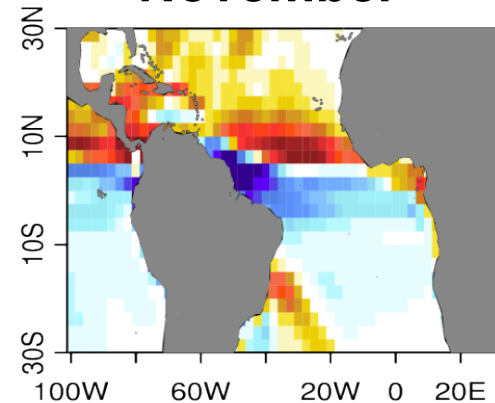
Vertical section of temperature biases at 5E, wrt GLORYS2v1

Vertical section of salinity biases at 5E, wrt GLORYS2v1

Net surface heat fluxes biases, wrt ERAint
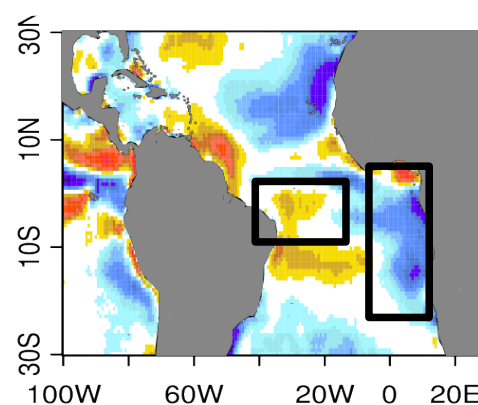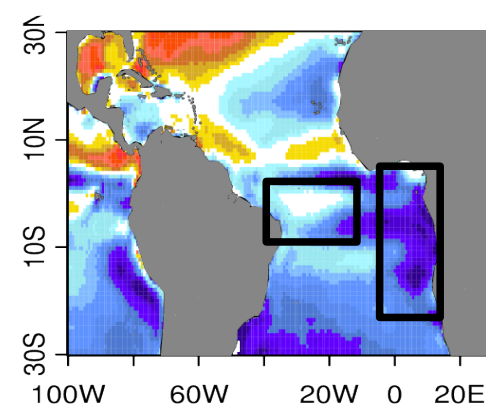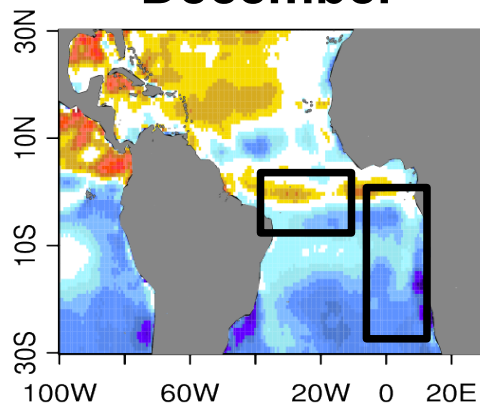
Future plans

- Biases of other surface quantities (wind stress, clear sky fluxes etc)?

- Look at daily quantities. Monthly means are not sufficient.
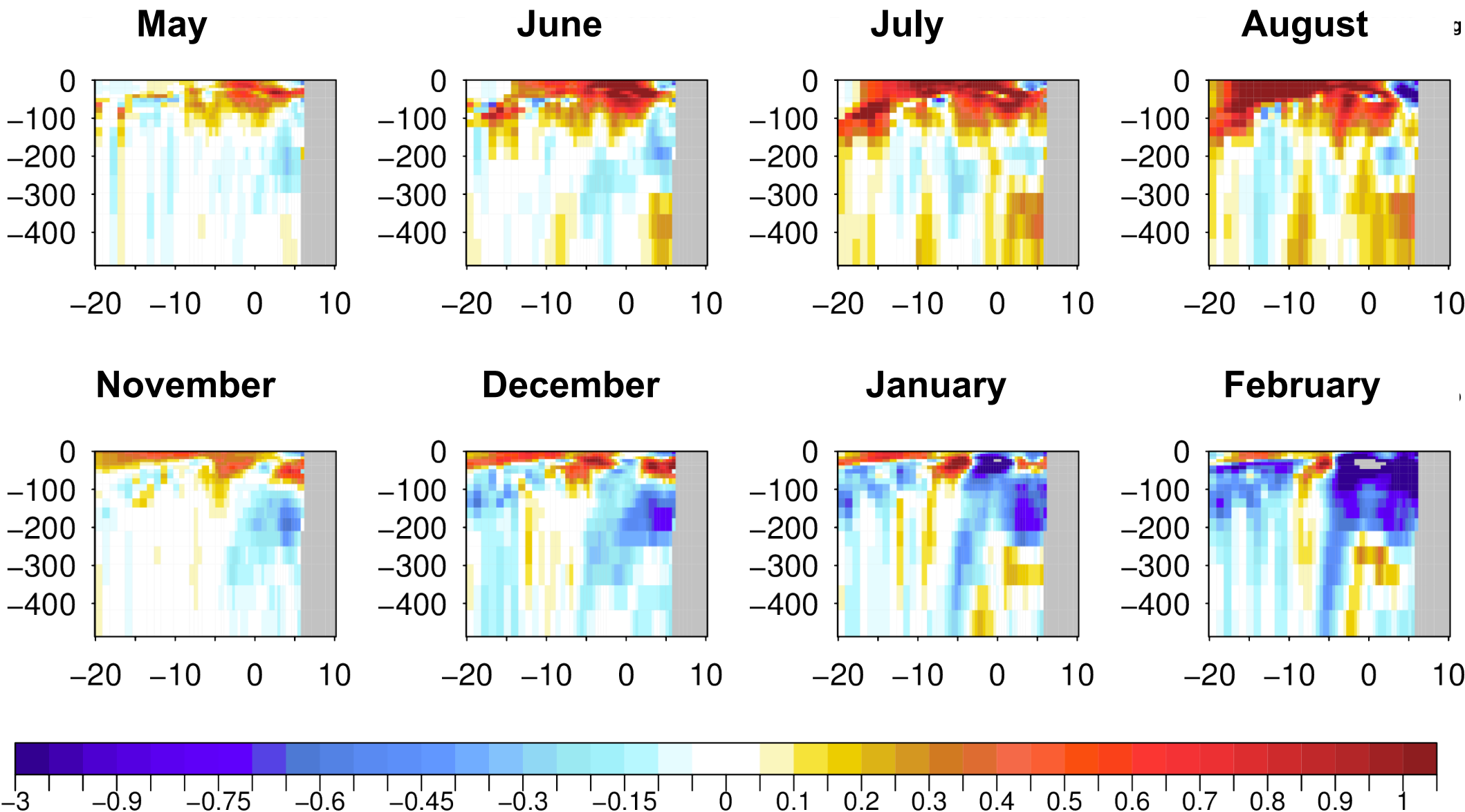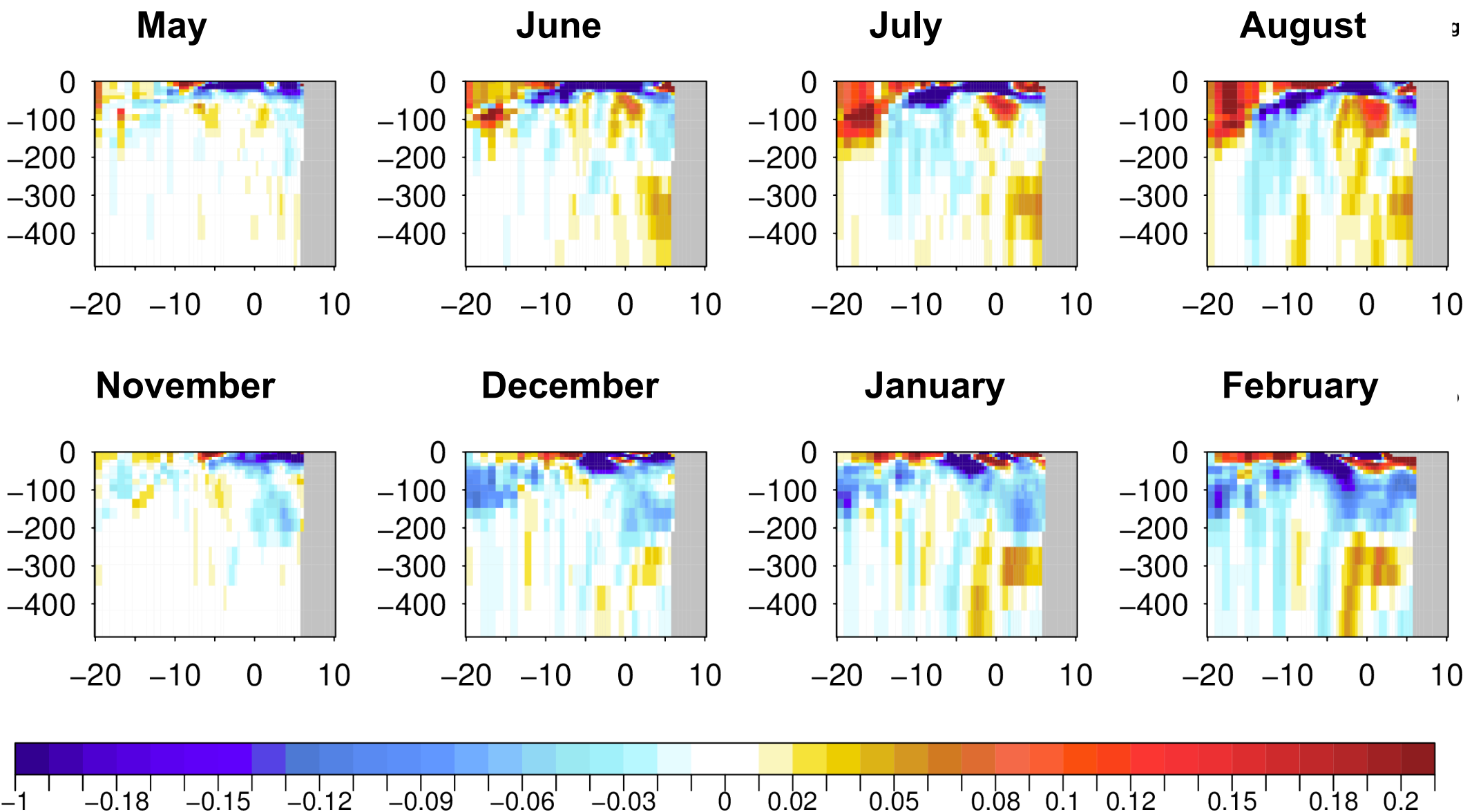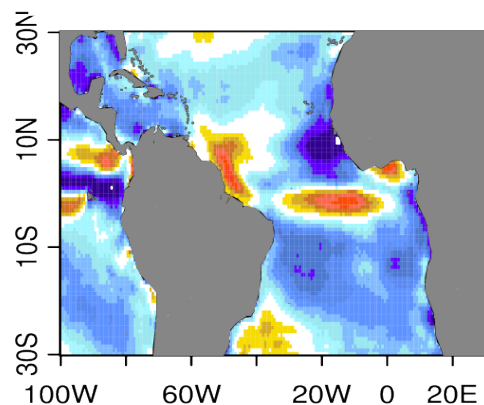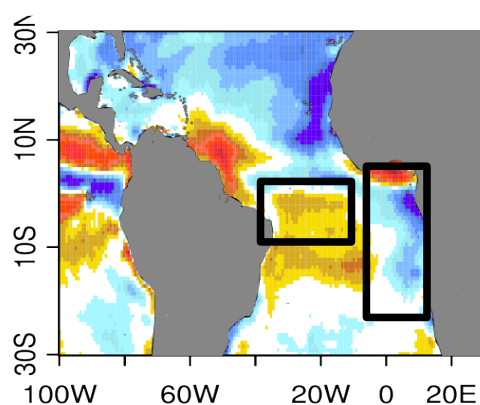
- Mostly focus on ocean: perform heat/salinity budgets. Explore possible dynamical mechanisms.

- Sensitivity to initialisation?

- Sensitivity to model resolution?

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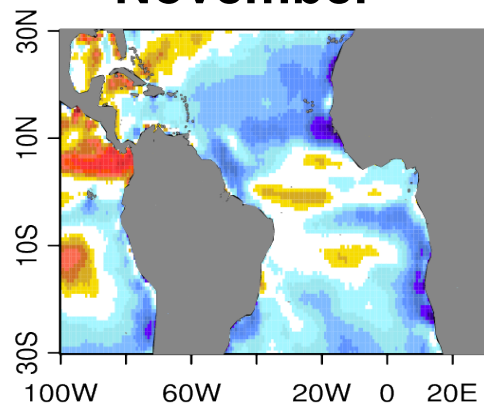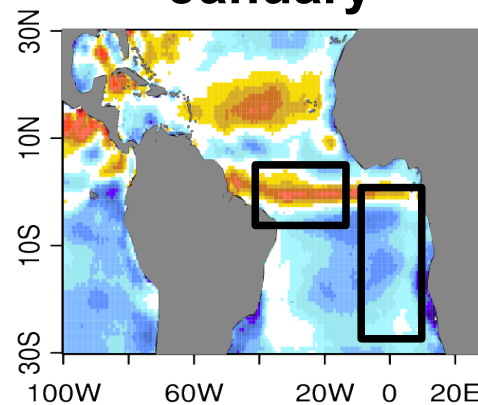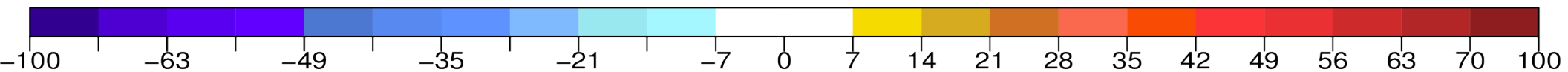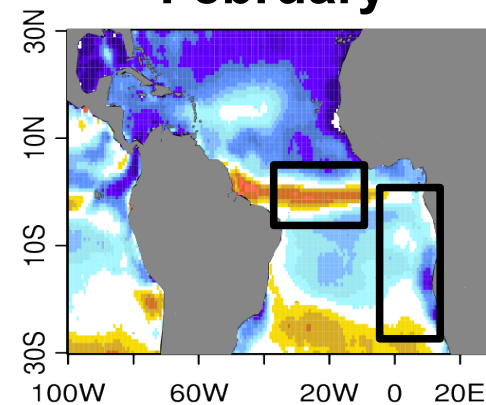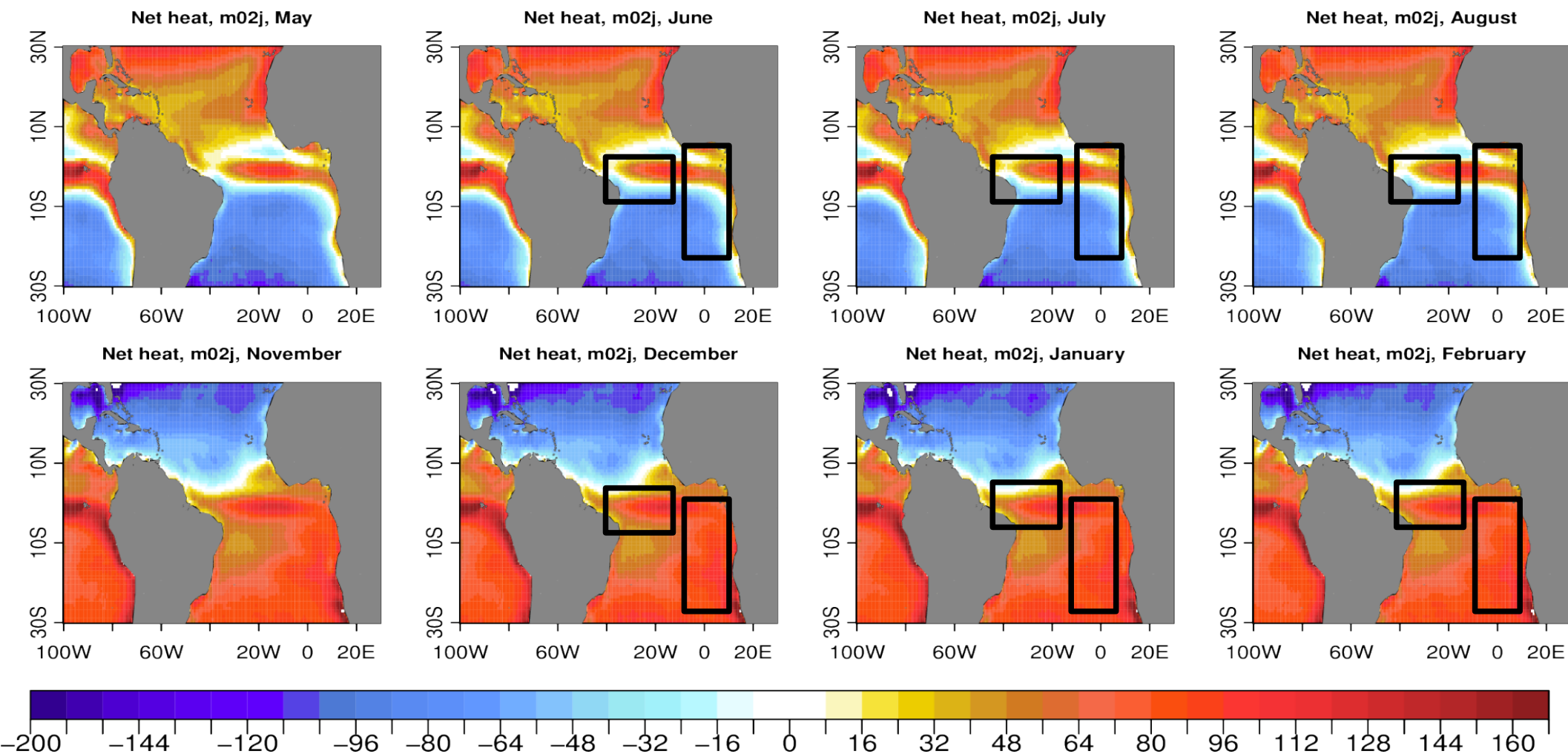
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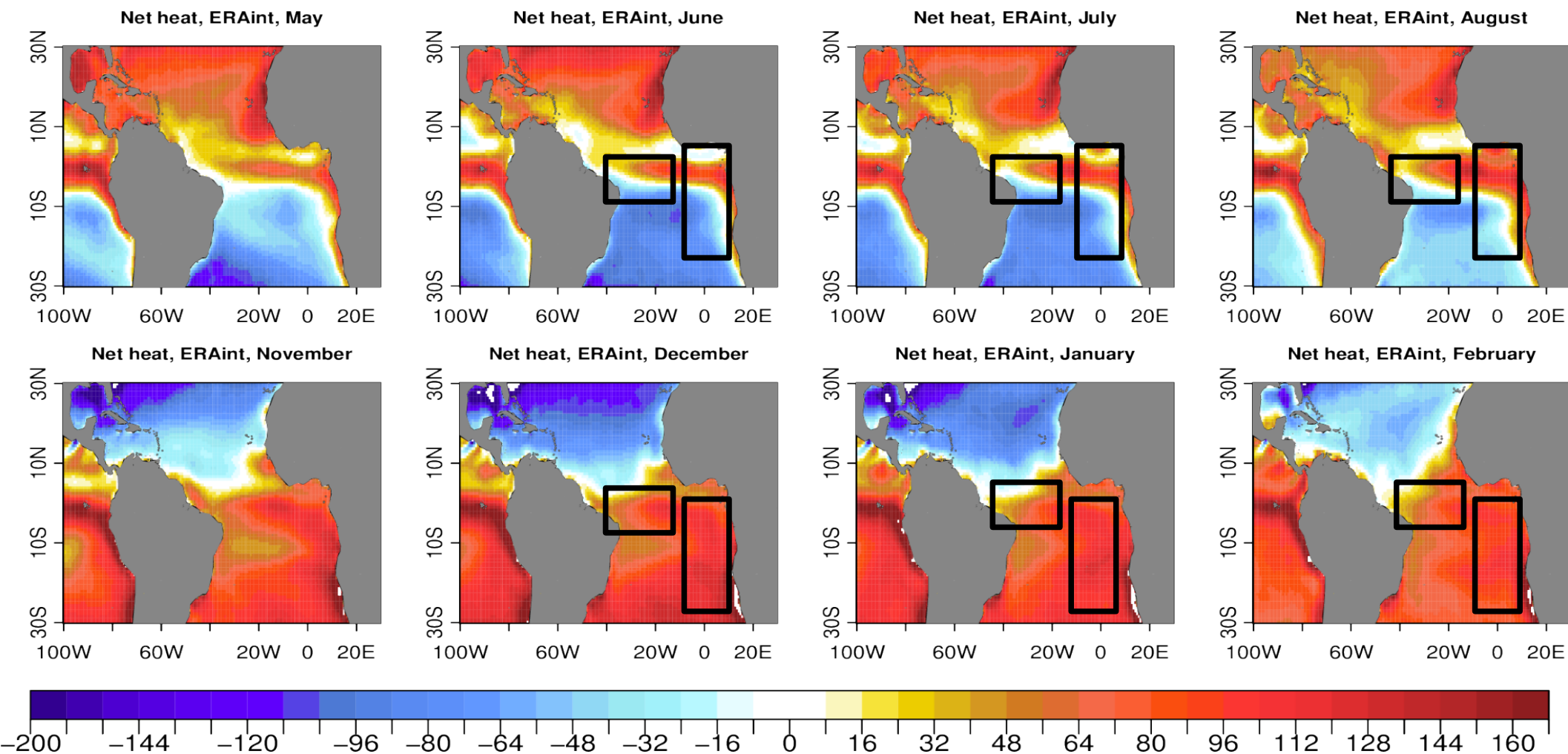
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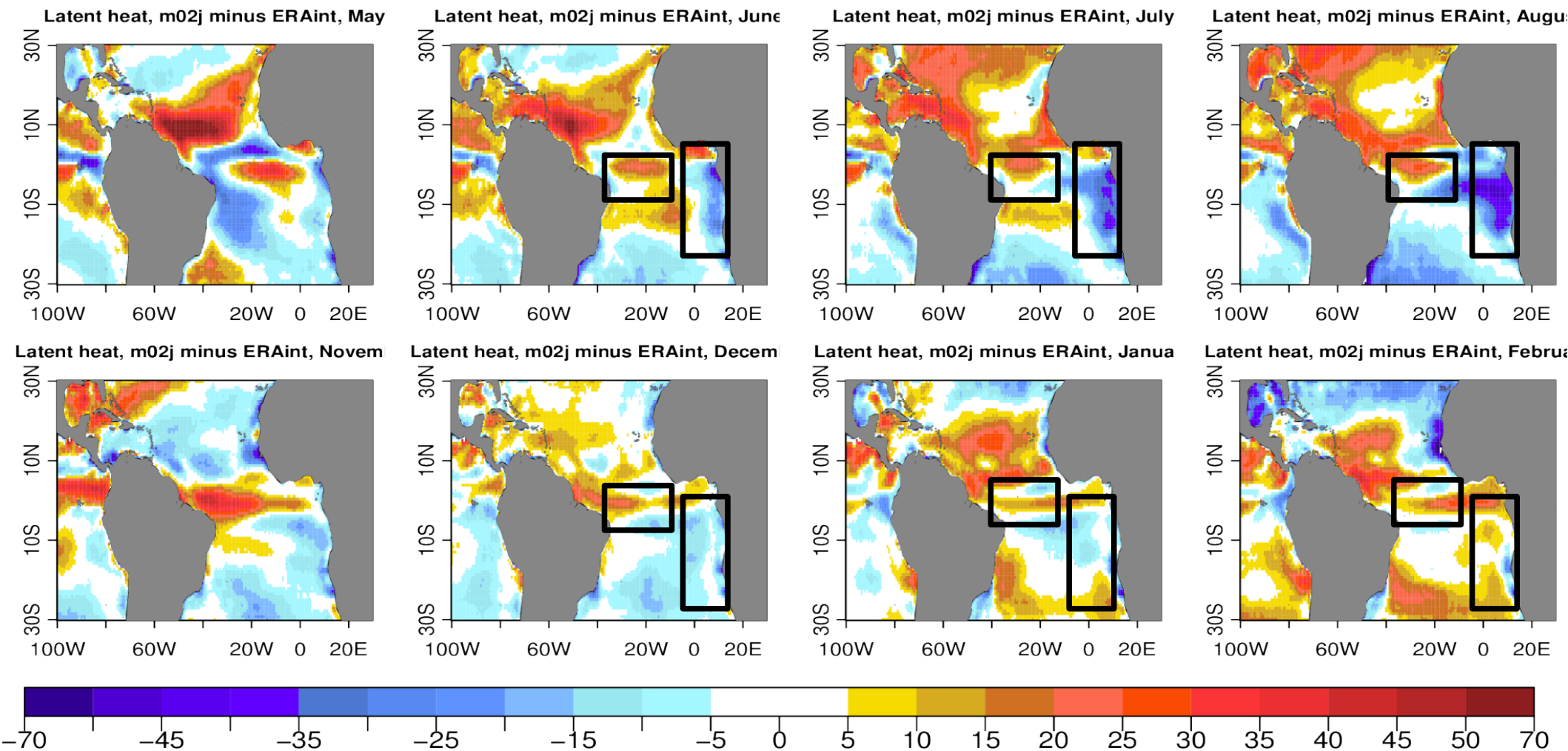 Thank you for your attention! Questions/feedback welcome!

Additional plots

Net surface fluxes of experiment

Net surface fluxes of ERAint

Latent heat surface fluxes biases, wrt ERAint

Solar heat surface fluxes biases, wrt ERAint